

# SERVICE MANUAL

## RA-1140 Optimum Digital Receiver

 **Sherwood**

### Specifications

#### AUDIO SECTION

MIN Continuous Average Power Output/CH,  
from 40Hz to 20KHz with no more than 0.5% THD

at 8 ohm, 40—20,000Hz	25W
at 8 ohm, 1KHz	27W

IMD 60Hz/7KHz=4:1

at 8 ohms/25W	0.5%
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Damping factor

at 8 ohm, 1KHz	40
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Input Sensitivity for rated Output at 1KHz

Phono	2.5mV
CD/AUX	150mV

Signal to Noise Ratio (Network A wtd/Unweighted)

Phono	90/65dB
Aux	95/85dB

Frequency Response

Phono RIAA 30—20,000Hz	±1dB
Aux —3dB	5Hz—40KHz

Tone Control

Bass at 100Hz	±10dB
Treble at 10KHz	±10dB

Loudness Control

at 100Hz	+7dB
at 10KHz	+3dB

Crosstalk

at 100Hz	60dB
at 1KHz	60dB
at 10KHz	50dB

#### TUNER SECTION

##### FM SECTION

Tuning Range 87.5—108MHz

Channel Space

UL/CSA	100KHz
Europe, Korea	50KHz

Usable Sensitivity, IHF  $3\mu\text{V}$  (14.7dBf)

50dB Quieting Sensitivity IHF

Mono	$7\mu\text{V}$ (22.1dBf)
Stereo	$70\mu\text{V}$ (42.1dBf)

THD at 1KHz/100% Modulation, IHF

Mono	0.5%
Stereo	0.8%

Signal to Noise Ratio, IHF

Mono	68dB
Stereo	62dB

Stereo Separation

at 1KHz(IHF)	38dB
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Frequency Response, —3dB

	20Hz—13KHz
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Capture Ratio

	3dB
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Alternate Channel Selectivity(±400Hz)

	55dB
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Image Rejection

	30dB
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IF Rejection

	60dB
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AM Rejection

	45dB
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Audio Output Level 400Hz 100% Mod

	±150mV
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Muting Level

	5—15μV
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##### AM SECTION

Tuning Range

UL/CSA	520—1610KHz
Europe, Korea	531—1602KHz

Channel Space

UL/CSA	10KHz
Europe, Korea	9KHz

Usable Sensitivity 20dB S/N

	$1000\mu\text{V}/\text{m}$
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Signal to Noise Ratio, 30% Modulation

	10dB
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Selectivity(±10KHz)

	20dB
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Note: Design and specifications subject to change without  
notice for improvements.

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# Electrical Measurements & Adjustment


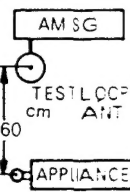
\* Before making adjustment, operate the appliance for more than 2 minutes.

## 1. TUNER SECTION

- ※ Note : 1. 0dB = 1 $\mu$ V  
 2. FM 100% Mod. = 75KHz Dev.  
 3. DVM = Digital Volt Meter  
 4. SG = Signal Generator  
 5. SSG = Stereo Signal Generator

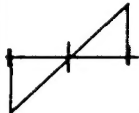
### 1. AM Adjustment

- Selector.....TUNER, MW(AM)
- In case of 2band appliance(AM/FM), MW is converted into AM.

No.	Subject	Feed Signal		Setting Appliance	Measure Output	Adjust Point	Adjust For	Remark
		From	To					
1	TUNING VOLTAGE			*1)520KHz	TPI Connect DVM	T105	DC1.45± V	
				*2)1610KHz	Same as above	TC105	DC8.5± V	
		• Repeat the step *1) and *2) until DVM reads the tuning voltage mentioned above. • In case the freq. step is 9KHz, the freq. of Am SG and appliance should be changed to *1)531KHz and *2)1404KHz						
2	IF	AM IF Genescope	ANT	1000	Connect IF Genescope	T106	Symmetrical curve on AM IF Genescope	
3	RF TUNING	*1) AM SG 600KHz, 78dB 400Hz(30% Mod.)	ANT.	600 KHz	Output Connect AC Voltmeter & Oscilloscope	T104	Maximize audio output	
		*2) AM SG 1400KHz, 78dB 400Hz(30% Mod.)	ANT.	1400KHz	Same as above	TC104	Same as above	
		• FEED SIGNAL should be fed to Loop ant. through the Test Loop ant., 60cm distant from the appliance. • Repeat the step *1) and *2) until no further improvement occurs. • In case the freq. step is 9KHz, the freq. of AM SG and appliance should be changed to *1)603KHz and *2)1404KHz						
4	SIGNAL METER	AM SG 1000KHz 400Hz(30% Mod.)	ANT.	1000KHz		VR102	TUNE LED lights slightly	
		• In case the freq. step is 9KHz, the freq. of AM SG and appliance should be changed to 999KHz.						

## 2. FM adjustment

- Selector.....TUNER, FM(MONO/STEREO)
- Deviation.....UL/CSA(75KHz Dev.)  
EUROPE(40KHz Dev.)

No.	Subject	Feed Signal		Setting	Measure	Adjust	Adjust	Remark
		From	To	Appliance	Output	Point	For	
1	TUNING VOLTAGE		108MHz	108MHz	TPI connect DVM	L105	DC $8.8 \pm 0.2V$	
2	IF	FM IF GENESCOPE	ANT	98MHz	connect IF Genescope	T103	Symmetrical S curve on FM IF Genescope	
					TP2 & TP3 connect DVM		DC $0 \pm 50mV$	
				Detune	connect Oscilloscope	T103	Maximize noise output	In case IF Genescope is not available
					TP2 & TP3 connect DVM		DC $0 \pm 50mV$	
3	RF TUNING	* 1) FM SG 90MHz, $1.58\mu V$ 1KHz(75KHz Dev.)	ANT	90MHz MONO	Output connect AC Volt meter & Distortion Analyzer and Oscilloscope	L101, L102, L103, L104	Maximize audio output	
		* 2) FM SG 106MHz, $1.58\mu V$ 1KHz(75KHz Dev.)	ANT	106MHz MONO	Same as above	TC101, TC102	Same as above	
		• Repeat the step * 1) and * 2) until no further improvement occurs.						
4	THD	FM SG 98MHz, 60dB 1KHz(75KHz Dev.)	ANT	98MHz MONO	* 1) Output connect DVM	T102	DC $0 \pm 0. V$	
					* 2) Output connect AC Voltmeter & Distortion Analyzer		Minimize distortion	
		• Adjust the step * 1) first, and the step * 2) next, and repeat until no further improvement occurs.						
5	MPX (VCO)	FMSSG 98MHz, 60dB 1KHz(75KHz Dev.) pilot 19KHz (9% Mod.)	ANT	98MHz STEREO	TP4 connect Freq. Counter	VR104	Read 76KHz	
		• Before adjustment, set the FM SSG to "Mod. OFF."						



6	THD (STEREO)	FM SSG 98MHz, 60dB 1KHz(75KHz Dev.) pilot 19KHz (9% Mod.)	ANT	98MHz STEREO	Output connect AC Volt meter & Distortion	T101	Minimize distortion	
2	MUTE LEVEL	FM SG 98MHz, 10 $\mu$ V 1KHz(75KHz Dev.)	ANT	98MHz STEREO	Output connect Osilloscope	VR101	Muting occurs marginally	
8	SEPARATION	* 1) FM SSG 98MHz, 60dB 1KHz(75KHz Dev.) pilot 19KHz(9% Mod) L CH Output	ANT	98MHz STEREO	R Ch Output connect AC Volt meter & Distortion Analyzer and Oscilloscope	VR103	Minimize Output	
		* 2) Same as above (R ch Output)			L ch Output connect same as above	VR103	Minimize Output	
		• Repeat the step * 1) and * 2) until no further improvement occurs.						

# Electrical Parts List

## MAIN BOARD 4002214900

Ref No.	Parts No.	Description	Position	Remark
● TRANSISTORS				
Q201L/R	2008610120	2SD 1302S	4D	
Q202L/R	2008015700	2SA 798G	3D	
Q203L/R	2008609102	MPS A06	3D	
Q205L/R	2008609101	MPS A05	2D	
Q206L/R	2008609102	MPS A06	2D/1D	
Q207L/R	2008209102	MPS A56	2D/1D	
Q208L/R	2028406123	2SD 2059Y	3D/2D	
Q209L/R	2028106109	2SB 1367Y	2D/1D	
Q211	2028406113	KTD 1406	2B	
Q212	2028106111	KTB 834Y	2C	
Q213	2208206105	KTA 1015Y	3C	
Q214	2008609101	MPS A05	2D	
● DIODES				
D201	2058100105	IN 5402	2C	
D202	2058100105	IN 5402	3C	
D203	2058100105	IN 5402	2C	
D204	2058100105	IN 5402	3C	
D205	2058599120	Zener DZ 16BM	3C	
D206	2058599120	Zener DZ 16BM	3C	
D207	2058106100	IN 4002	3C	
D208	2058599109	Zener DZ 15BM	3C	
D209	2058306101	IN 4148	3C	
D210	2058106124	IN 4002	3C	
D211	2058599109	Zener DZ 15BM	2D	
D212L/R	2058106100	IN 4002	3D/1D	
D213L/R	2058106100	IN 4002	1D	
D216	2058306101	IN 4148	4D	
● RESISTORS				
R200	3009335373	M.O 3.3M ½W	3B	
R201L/R	3069102270	C.F 1K ¼W	4D	
R202L/R	3069102270	C.F 1K ¼W	4D	
R204L/R	3069104270	C.F 100K ¼W	4D	
R205L/R	3069224270	C.F 220K ¼W	4D	
R206L/R	3069103270	C.F 10K ¼W	3D	
R207	3039152372	M.O 1.5K ½W	2D	
R208L/R	3069151270	C.F 150 ¼W	3D	
R209L/R	3069102270	C.F 1K ¼W	3D	
R210L/R	3069473270	C.F 47K ¼W	3D	
R211L/R	3069152270	C.F 1.5K ¼W	2D/3D	
R212L/R	3069392270	C.F 3.9K ¼W	2D/3D	
R213L/R	3069473270	C.F 47K ¼W	3D	
R214L/R	3069272270	C.F 2.7K ¼W	3D	
R216L/R	3069154270	C.F 150K ¼W	3D	
R218L/R	3069152270	C.F 1.5K ¼W	2D/1D	
R220L/R	3069561270	C.F 560 ¼W	2D/1D	
R222L/R	3039271372	M.O 270 ½W	2D/1D	
R223L/R	3059278582	WW C.E 0.27 2W	3D/2D	
R224L/R	3069278582	WW C.E 0.27 2W	2D/1D	
R229L/R	3069153270	C.F 15K ¼W	4C	
R230L/R	3069332270	C.F 3.3K ¼W	4C	
R231L/R	3069184270	C.F 180K ¼W	4C	
R232L/R	3069152270	C.F 1.5K ¼W	4D	
R233L/R	3069821270	C.F 820 ¼W	4D/4C	
R234L/R	3069220270	C.F 22 ¼W	1D/2D	
R235L/R	3069220270	C.F 22¼W	1D/2D	
R236 /R	3039220472	M.O 22ohm 1W	3C	
R237	3069102270	C.F 1K ¼W	3C	
R238	3069561270	C.F 560 ¼W	3C	
R239	3039270472	M.O 271W	3C	
R240	3069102270	C.F 1K ¼W	3C	
R241	3069561270	C.F 560 ¼W	2C	
R242	3039330472	M.O 33 1W	2C	
R243	3069152270	C.F 1.5K ¼W	3C	
R244	3069823270	C.F 82K ¼W	3C	
R245	3069103270	C.F 10K ¼W	3C	
R246	3069101270	C.F 100 ¼W	4C	
R247	3069562270	C.F 5.6K ¼W	4C	
R248	3069103270	C.F 10K ¼W	3D	
R249L/R	3039221472	M.O 220 1W	4C	
RF5L/R	3009335373	M.O 3.3 ½W	1D	
RF6L/R	3069220270	C.F 22 ¼W	1C/1D	
RF7L/R	3069220270	C.F 22 ¼W	1C/1D	
● CAPACITORS				
C201L/R	3479222061	Elect 22µ/F/350	4D	
C202L/R	3579331130	Ceramic 330P/50V	3D	

Ref No.	Parts No.	Description	Position	Remark
C205L/R	3579222530	Ceramic 0.0022µ/50V	3D	
C206L/R	3479210061	Elect 10µ/35V	4D	
C207L	3409247041	Elect 47µ/35V	2D	
C209L/R	3479210061	Elect 10µ/35V	3D	
C210L/R	3579470130	Ceramic 47P/50V	3D	
C211L/R	3579809030	Ceramic 8P/50V	3D	
C212L/R	3409247041	Elect 22µ/16V	3D	
C213	3479210971	Elect 1µ/50V	2D	
C214	3479233061	33µ/35V	2D	
C225L/R	3679153120	Mylar 0.015µ/100V	4C	
C226L/R	3679683120	0.068µ/100V	4C	
C227L/R	3679472120	Mylar 0.0047µ/100V	4C	
C228L/R	3679223120	Mylar 0.022µ/100V	4D/4C	
C229	3509103450	Ceramic 0.01µ/500V	2C	
C230	3509103450	Ceramic 0.01µ/500V	3C	
C231	3419533294	Elect 3300µF/40V	3C	
C232	3419533294	Elect 3300µF/40V	2C	
C233	3409222141	Elect 220µ/250	3C	
C234	3409222141	Elect 220µ/250	3C	
C235	3409210131	Elect 100µ/25V	3C	
C236	3409210131	Elect 100µ/25V	2C	
C237	3479247031	Elect 47µ/16V	3C	
C238	3479210071	Elect 10µ/50V	3C	
C239	3479210061	Elect 10µ/35V	3C	
C240	3549472407	Elect 0.0047/400VAC	3B	
C241L/R	3679473120	Mylar 0.047/100V	1D/2C	
CF10L/R	3579561130	Ceramic 560P/50V	4C	
CF11L/R	3679473120	Mylar 0.047/100V	1C/1D	
CF12L/R	3579222530	Ceramic 2200P/50V	1D	
CF13L/R	3579222530	Ceramic 2200P/50V	1D	

## LCD BOARD 4002214910

Ref No.	Parts No.	Description	Position	Remark
● IC				
IC301	2138010101	MN1527KMA	1C	
● TRANSISTORS				
Q301	2208606108	KTC2240BL	1B	
Q302	2018211100	FTT. 2SK168D	2B	
Q303	2208606104	KTC 1815Y	1B	
Q304	2208606104	KTC 1815Y	1C	
Q305	2208606105	KTA 1015Y	1C	
● DIODES				
D301	2058599104	Zener DZJ.6BM	1B	
D302	2058306101	IN 4148	1B	
D303	2058306101	IN 4148	1B	
● RESISTORS				
R301	3069101270	C.F 100 ¼W	1B	Add Ceramic Pipe
R302	3069103270	C.F 10K ¼W	2B	
R303	3069102270	C.F 1K ¼W	1B	
R304	3069101270	C.F 100 ¼W	1B	
R305	3069102270	C.F 1K ¼W	1B	
R306	3069151270	M.O 150 1W	1B	
R307	3069104270	C.F 100K ¼W	1B	
R308	3069104270	C.F 100K ¼W	1B	
R309	3069103270	C.F 10K ¼W	1B	
R310	3069103270	C.F 10K ¼W	1C	
R311	3069223270	C.F 22K ¼W	1B	
R312	3069103270	C.F 10K ¼W	1C	
R313	3069102270	C.F 1K ¼W	1C	
R314	3069103270	C.F 10K ¼W	1C	
R315	3069223270	C.F 22K ¼W	1C	
R316	3069103270	C.F 10K ¼W	1C	
R317	3069473270	C.F 47K ¼W	1C	
R318	3069103270	C.F 10K ¼W	1C	C.D.E.F GND(0)
R319	3069473270	C.F 47K ¼W	1C	
R320	3069473270	C.F 47K ¼W	1C	
R321	3069473270	C.F 47K ¼W	1C	
R322	3069473270	C.F 47K ¼W	1C	
R323	3069473270	C.F 47K ¼W	1C	
● CAPACITORS				
C301	3579103530	Ceramic 0.01µ/50V	2B	
C302	3479210971	Elect 1µ/50V	1B	
C303	3479247031	Elect 47µ/16V	1B	
C304	3579103530	Ceramic 0.01µ/50V	1B	
C305	3579103530	Ceramic 0.01µ/50V	1B	
C306	3479247031	Elect 47µ/16V	1C	
C307	3409222211	Elect 2200µ/6.3V	1B	
C308	3579103530	Ceramic 0.01µ/50V	1B	
C309	3479	Ceramic 0.1µ/50V	1B	
C310	3479210971	Elect 1µ/50V	1B	
C311	3479210871	Elect 0.1µ/50V	1B	
C312	3529220210	Ceramic 22P/50V(CH)	1B	
C313	3529220210	Ceramic 22P/50V(CH)	2B	
C314	3509473530	Ceramic 0.047µ/50V	2B	
C315	3509473530	Ceramic 0.047µ/50V	1B	
LCD	2338009920	SLC-60106RSN	2C	
X-TAL	3908101050	4.5MHz	2B	

## FRONT BOARD 4002214930

Ref No.	Parts No.	Description	Position	Remark
● DIODES				
D401	2308220130	LED SLV56URC	3A	
D404	2308220507	LED SLV56DC3	3A	
D405	2308220507	LED SLV56DC3	2A	
D406	2308220507	LED SLV56DC3	2A	
D407	2308220507	LED SLV56DC3	2A	
D408	2308220130	LED SLV56URC	2A	
D409	2308220507	LED SLV56DC3	2A	
● RESISTORS				
R401	3069132270	C.F 1.3K ¼W	1A	
R402	3069132270	C.F 1.3K ¼W	1A	
R403	3069132270	C.F 1.3K ¼W	1A	
R404	3069181270	C.F 180 ¼W	1A	
R405L/R	3069102270	C.F 1K ¼W	1A	

## LCD LAMP BOARD 4002214920

Ref No.	Parts No.	Description
LAMP	2528203810	BQ051-34303A

## BIAS BOARD 4002214930

Ref No.	Parts No.	Description
Q204L/R	2008610102	2SD1302S

## SW BOARD 4002214940

Ref No.	Parts No.	Description
● CAPACITORS		
C154	3579471130	Ceramic 470P
C156	3579471130	Ceramic 470P
● POWER TRANSFORMERS		
	2828055707	
	2828056607	
	2828056501	
● FUSES		
F201	5508212231	NB 31.8 1.5A
	5508301934	T.L 20 800mA
	5508212230	NB 31.8 1.5A
F202	5508212031	NB 31.8 1A/2
	5508212030	NB 31.8 1A/2
F203L/R	5508212831	N.B 31.8 3.5A
	5508402734	FB 20 3 15A/2
	5508212830	NB 31.8 3.5A

### \* REMARK

VERSION	COUNTRY
A	USA/CANADA
B	US MILITARY/OTHER COUN
C	GENERAL EUROPE
D	GERMANY
E	AUSTRALIA/BRITISH
F	SCANDINAVIAN COUN

LCD BOARD 4002214910

Ref No.	Parts No.	Description	Position	Remark
●IC				
IC301	2138010101	MN1527KMA	1C	
●TRANSISTORS				
Q301	2208606108	KTC2240BL	1B	
Q302	2018211100	FTT. 2SK168D	2B	
Q303	2208606104	KTC 1815Y	1B	
Q304	2208606104	KTC 1815Y	1C	
Q305	2208606105	KTA 1015Y	1C	
●DIODES				
D301	2058599104	Zener DZJ. 68M	1B	
D302	2058306101	IN 4148	1B	
D303	2058306101	IN 4148	1B	
●RESISTORS				
R301	3069101270	C.F 100 ¼W	1B	Add Ceramic Pipe
R302	3069103270	C.F 10K ¼W	2B	
R303	3069102270	C.F 1K ¼W	1B	
R304	3069101270	C.F 100 ¼W	1B	
R305	3069102270	C.F 1K ¼W	1B	
R306	3069151270	M.O 150 1W	1B	
R307	3069104270	C.F 100K ¼W	1B	
R308	3069104270	C.F 100K ¼W	1B	
R309	3069103270	C.F 10K ¼W	1B	
R310	3069103270	C.F 10K ¼W	1C	
R311	3069223270	C.F 22K ¼W	1B	
R312	3069103270	C.F 10K ¼W	1C	
R313	3069102270	C.F 1K ¼W	1C	
R314	3069103270	C.F 10K ¼W	1C	
R315	3069223270	C.F 22K ¼W	1C	
R316	3069103270	C.F 10K ¼W	1C	
R317	3069473270	C.F 47K ¼W	1C	
R318	3069103270	C.F 10K ¼W	1C	C.D.E.F GND(0)
R319	3069473270	C.F 47K ¼W	1C	
R320	3069473270	C.F 47K ¼W	1C	
R321	3069473270	C.F 47K ¼W	1C	
R322	3069473270	C.F 47K ¼W	1C	
R323	3069473270	C.F 47K ¼W	1C	
●CAPACITORS				
C301	3579103530	Ceramic 0.01µ/50V	2B	
C302	3479210971	Elect 1µ/50V	1B	
C303	3479247031	Elect 47µ/16V	1B	
C304	3579103530	Ceramic 0.01µ/50V	1B	
C305	3579103530	Ceramic 0.01µ/50V	1B	
C306	3479247031	Elect 47µ/16V	1C	
C307	3409222211	Elect 2200µ/6.3V	1B	
C308	3579103530	Ceramic 0.01µ/50V	1B	
C309	3479	Ceramic 0.1µ/50V	1B	
C310	3479210971	Elect 1µ/50V	1B	
C311	3479210871	Elect 0.1µ/50V	1B	
C312	3529220210	Ceramic 22P/50V(CH)	1B	
C313	3529220210	Ceramic 22P/50V(CH)	2B	
C314	3509473530	Ceramic 0.047µ/50V	2B	
C315	3509473530	Ceramic 0.047µ/50V	1B	
LCD	2338009920	SLC-60106RSN	2C	
X-TAL	3908101050	4.5MHz	2B	

FRONT BOARD 4002214930

Ref No.	Parts No.	Description	Position	Remark
●DIODES				
D401	2308220130	LED SLV56URC	3A	
D404	2308220507	LED SLV56DC3	3A	
D405	2308220507	LED SLV56DC3	2A	
D406	2308220507	LED SLV56DC3	2A	
D407	2308220507	LED SLV56DC3	2A	
D408	2308220130	LED SLV56URC	2A	
D409	2308220507	LED SLV56DC3	2A	
●RESISTORS				
R401	3069132270	C.F 1.3K ¼W	1A	
R402	3069132270	C.F 1.3K ¼W	1A	
R403	3069132270	C.F 1.3K ¼W	1A	
R404	3069181270	C.F 180 ¼W	1A	
R405L/R	3069102270	C.F 1K ¼W	1A	

LCD LAMP BOARD 4002214920

Ref No.	Parts No.	Description	Position	Remark
LAMP	2528203810	BQ051-34303A	3B	

BIAS BOARD 4002214950

Raf No.	Parts No.	Description	Position	Remark
Q204L/R	2008610102	2SD1302S	4B	

SW BOARD 4002214940

Ref No.	Parts No.	Description	Position	Remark
●CAPACITORS				
C154'	3579471130	Ceramic 470PF/50V	4A	
C156'	3579471130	Ceramic 470PF/50V	4A	B
●POWER TRANSFORMERS				
	2828055707			A
	2828056607			C,D,F
	2828056501			B,E
●FUSES				
F201	5508212231	NB 31.8 1.5A/250V SJUL	3C	A,B
	5508301934	T.L 20 800mA/250V SEMO	3C	C,D,F,E
	5508212230	NB 31.8 1.5A/250V KS	3C	
F202	5508212031	NB 31.8 1A/250V SJUL	3C	B
	5508212030	NB 31.8 1A/250V KS	3C	
F203L/R	5508212831	N.B 31.8 3.5A/250V SJUL	3D	A,B
	5508402734	FB 20 3.15A/250V Semko	3D	C,D,E,F
	5508212830	NB 31.8 3.5A/250V KS	3D	

\*REMARK

VERSION	COUNTRY	AC INPUT	REMARK (SAFETY)
A	USA/CANADA	120V/60Hz	UL,CSA
B	U.S MILITARY/OTHER COUNTRIES	120.220V/60.50Hz	
C	GENERAL EUROPE	220V/50Hz	IEC-65
D	GERMANY	220V/50Hz	FTZ
E	AUSTRALIA/BRITISH	240V/50Hz	SAA,BSI
F	SCANDINABIAN COUNTRY	220V/50Hz	(S) (N) (D) (Fi) (d)

# Electrical Parts List

## TUNER BOARD 400221500

Ref No.	Parts No.	Description	Position	Remark
• ICS				
IC101	2168017128	LA1266	2A	IF
IC102	2168411105	HA12016	3C	MPX
IC103	2168220104	NJM 4558DD	1B	PHONO EQ
• COILS				
L101	2648001260	FM ANT	1C	
L101	2648001410	FM ANT	1C	FTZ
L102	2648001270	FM RF1(A)	1C	
L102	2648001390	FM RF1(A)	1C	FTZ
L103	2648001280	FM RF1(B)	1C	
L103	2648001410	FM RF1(B)	1C	FTZ
L104	2648001290	FM RF2(A)	1C	
L104	2648001290	FM RF2(A)	1C	FTZ
L105	2638001060	FM OSC	2C	
L106	2648601400	Inductor 2.2μH	2C	
L107(4)	2648001290	FM RF2(A)	1C	FTZ
L109L/R(F)	2648601470	50μH	1B	FTZ
LF10		Inductor 20.8mH	2B	FTZ only, but delete 3J115
	2648601010	Inductor 2.2μH		FTZ only, but delete 6J113
	2648601010	Inductor 2.2μH		FTZ only, but delete R113
T101	2838001030	IFT FM	C2	
T102	2838501110	Quad Det(A)FM	2A	
T103	2838501210	Quad Det(B)FM	2A	
T104	2608201120	OSC AM	2A	
T106	2848001250	IFT AM	2A	
• CAPACITORS				
TC101	3838001000	Trimmer TZ03R110F	1C	
TC102	3838001000	Trimmer TZ03R110F	2C	
TC103(4)	3838001000	Trimmer TZ03R110F	1C	FTZ
TC104	3838001010	Trimmer TZ03R200F	1B	
TC105	3579309030	Ceramic 5p/50V	2A	
	3529209210	Ceramic 2P/50V(CH)		
CF101	3908011010	F.C Ceramic 10.7MA8	2C	FTZ only, then Using 10.7MS3GH-A
CF102	3908011001	F.C Ceramic 10.7MA8	2B	FTZ only, then Using 10.7MS3GH-A
CF102	3908011001	F.C Ceramic 10.7MA8	2B	Using for FTZ but delete 4J112
CF103(4)	265830110	F.M 19KHz	3B	Using for FTZ but delete 4J112
	2658301100	F.M 19KHz	3C	FTZ only, but delete 3J120
CF104	3908001150	F.C SFZ 450B	2B	
CF105	3908001020	F.C BFU 450C4N	2B	
• TRANSISTORS				
Q101	2018213100	FET 3SK74L	1C	
Q102	2008406103	KTC 1923	2C	
Q103	2008406103	KTC 1923	2C	
Q104	2018206110	KTK 161YR	2C	
Q105	2008406103	KTC 1923	2C	
Q106	2008409101	LM 9018F	2B	
Q107	2208606104	KTC 1815	3C	
Q108	2208606105	KTA 1015	3C	
Q109	2208606104	KTC 1815	3C	
Q100	2208606105	KTA 1015	3C	
Q111	2208606104	KTC 1815	3C	
Q112	2208606104	KTC 1815	3C	
Q113	2208606105	KTA 1015	3C	
Q114	2208606104	KTC 1815	3C	
Q115	2208606104	KTC 1815	3B	
• DIODES				
D101	2058819107	Varactor KV 1310A	1C	
D102	2058819107	Varactor KV 1310A	1C	
D103(4)	2058819107	Varactor KV 1310A	1C	FTZ
D104	2058819106	Varactor KV 1310A	2C	
D105	2058819106	Varactor KV 1236Z	1B	FTZ KV123SZ
D106	2058819107	Varactor KV 1236Z	2A	FTZ KV123SZ
D107	2058106100	IN 4148	2B	
D108	2058106100	IN 4148	2B	
D109	2058106100	IN 4148	3C	
D110	2058106100	IN 4148	2C	
D111	2058106100	IN 4148	3C	
D112	2058106100	IN 4148	2C	
D113	2058106100	IN 4148	3C	
D114	2058106100	IN 4148	3C	
D115	2058100100	IN 4148	2A	

Ref No.	Parts No.	Description	Position	Remark
D116	2058106100	IN 4148	3B	
• SEMICONDUCTOR RESISTORS				
VR101		Semi 22K(B)	2B	
VR102		Semi 22K(B)	2B	
VR103		Semi 220K(B)	3B	
VR104		Semi 3.3K(B)	2C	
• RESISTORS				
R101	3069333970	C.F 33K ½W	1C	
R102	3069105970	C.F 1M ½W	1C	
R103	3069104970	C.F 100K ½W	1C	
R104	3069104970	C.F 100K ½W	1C	
R105	3069473970	C.F 47K ½W	1C	
R106	3069181970	C.F 180 ½W	1C	
R107	3069470970	C.F 47 ½W	1C	
R108	3069101970	C.F 100 ½W	1C	
R109	3069333970	C.F 33K ½W	1C	
R110	3069472970	C.F 4.7K ½W	2C	
R111	3069561970	C.F 560 ½W	2C	
R112	3069473970	C.F 47K ½W	2C	
R113	3069333970	C.F 33K ½W	2C	
R114	3069103970	C.F 10K ½W	2C	
R115	3069101970	C.F 100 ½W	2C	
R116	3069822970	C.F 8.2K ½W	2C	
R117	3069332970	C.F 3.3K ½W	2C	
R118	3069274970	C.F 270K ½W	2C	
R119	3069101970	C.F 100 ½W	2C	
R120	3069820970	C.F 82 ½W	2C	
R121(4)	3069333970	C.F 33K ½W	1C	FTZ
R122	3069273970	C.F 27K ½W	1C	
R123	3069471970	C.F 470 ½W	2C	
R124	3069561970	C.F 560 ½W	2C	
R125	3069181970	C.F 180 ½W	2C	
R126	3069332970	C.F 3.3K ½W	2B	
R127	3069471970	C.F 470 ½W	2B	
R128	3069331970	C.F 330 ½W	2B	
R129		C.F 100 ½W	2B	with Ceramic Pipe
R130		C.F 100 ½W	2B	with Ceramic Pipe
R131	3069561970	C.F 560 ½W	2B	
R132	3069101970	C.F 100 ½W	2B	
R133	3069223970	C.F 22K ½W	1B	
R134	3069333970	C.F 33K ½W	2A	
R135		C.F 470 ½W	2A	with Ceramic Pipe
R136	3069683970	C.F 68K ½W	2A	
R137	3069332970	C.F 3.3K ½W	2A	
R138	3069103970	C.F 10K ½W	2A	
R139		C.F 22 ½W	2B	with Ceramic Pipe
R140	3069222970	C.F 2.2K ½W	2B	
R141	3069472970	C.F 4.7K ½W	2B	
R142	3069104970	C.F 100K ½W	2B	
R143	3069753970	C.F 75K ½W	2B	
R144	3069563970	C.F 56K ½W	3C	
R145	3069103970	C.F 10K ½W	2B	
R146	3069103970	C.F 10K ½W	2A	
R147	3069220970	C.F 22 ½W	2B	
R148	3069223970	C.F 22K ½W	3B	
R149	3069332970	C.F 3.3K ½W	3B	
R150	3069223970	C.F 22K ½W	3C	
R151	3069332970	C.F 3.3K ½W	3C	
R152	3069392970	C.F 3.9K ½W	3B	
R153		C.F 47 ½W	2B	with Ceramic Pipe
R154	3069332970	C.F 3.3K ½W	3B	
R155	3069473970	C.F 47K ½W	3C	
R156	3069332970	C.F 3.3K ½W	3C	
R157	3069473970	C.F 47K ½W	3B	
R158	3069332970	C.F 3.3K ½W	3B	
R159	3069332970	C.F 3.3K ½W	3B	
R160	3069332970	C.F 3.3K ½W	3C	
R161	3069332970	C.F 3.3K ½W	3B	
R162	3069104970	C.F 100K ½W	3C	
R163	3069562970	C.F 5.6K ½W	2C	
R164	3069102970	C.F 1K ½W	3C	
R165	3069223970	C.F 22K ½W	2B	
R166	3069103970	C.F 10K ½W	3C	
R167	3069473970	C.F 47K ½W	3C	
R168	3069473970	C.F 47K ½W	3C	
R169	3069103970	C.F 10K ½W	3C	
R170	3069473970	C.F 47K ½W	3C	
R171	3069103970	C.F 10K ½W	3C	
R172	3069103970	C.F 10K ½W	3C	

Ref No.	Parts No.	Description	Position	Remark
R173	3069473970	C.F 47K ½W	3C	
R174	3069223970	C.F 22K ½W	3C	
R175	3069473970	C.F 47K ½W	3C	
R176	3069103970	C.F 10K ½W	3C	
R177	3069103970	C.F 10K ½W	3C	
R178	3069473970	C.F 47K ½W	3C	
R179	3069103970	C.F 10K ½W	3C	
R180	3069103970	C.F 10K ½W	3C	
R181	3069183970	C.F 18K ½W	2A	The Other Region 47K
R182L/R	3069102970	C.F 1K ½W	1B	
R183L/R	3069104970	C.F 100K ½W	1B	
R184L/R	3069564970	C.F 560K ½W	1B/1A	
R185L/R	3069433970	C.F 43K ½W	1B/1A	
R186L/R	3069911970	C.F 910K ½W	1B/1A	
R187		C.F 56 ½W	2B	
R188		C.F 56 ½W	1B	
R189L/R	3069104970	C.F 100K ½W	1B/1A	
R190L/R	3069561970	C.F 560K ½W	1B/1A	
R191L/R	3069102970	C.F 1K ½W	1A	
R192L/R	3069102970	C.F 560 ½W	1A	
R193L/R	3069102970	C.F 1K ½W	1A	
R194L/R	3069102970	C.F 1K ½W	1A	
R195L/R	3069823970	C.F 82K ½W	3B	
R196L/R	3069272970	C.F 2.7K ½W	3B	
R197	3069272970	C.F 82K ½W	1C	
RF1L/R	3069104970	C.F 100K ½W	1A	
RF2L/R	3069104970	C.F 100K ½W	1A	
RF3L/R	3069104970	C.F 100K ½W	1A	
RF4L/R	3069104970	C.F 100K ½W	1A	
• CAPACITORS				
C101(F)	3529309210	Ceramic 3P/50V(CH)	1C	FTZ
C102(4)	3509200130	Ceramic 20P/50V	1C	FTZ
C103	3509101130	Ceramic 100P/50V	1C	
C104	3509203530	Ceramic 0.02μ/50V	1C	
C105	3509102530	Ceramic 0.001μ/50V	1C	
C106	3509203530	Ceramic 0.02μ/50V	1C	
C107(4)	3509200130	Ceramic 20P/50V	1C	FTZ
C108	3529809110	Ceramic 8P/50V(RH)	1C	
C109	3509101130	Ceramic 100P/50V	2C	
C110(4)	3509200130	Ceramic 20P/50V	1C	FTZ
C111(4)	3509809030	Ceramic 8P/50V	1C	FTZ
C112	3479210971	Elect 1μF/50V	2C	
C113	3509203530	Ceramic 0.02μ/50V	2C	
C114	3529209210	Ceramic 2P/50V(CH)	2C	
C115	3529809210	Ceramic 8P/50V(CH)	2C	
C116	3529109210	Ceramic 1P(CH)	2C	
C117	3529809210	Ceramic 8P/50V(RH)	2C	
C118	3529330210	Ceramic 33P/50V(CH)	2C	
C119	3529150110	Ceramic 15P/50V(RH)	2C	
C120	3509103530	Ceramic 0.01μ/50V	2C	
C121	3509103530	Ceramic 0.01μ/50V	2C	
C122	3509473530	Ceramic 0.047μ/50V	2C	
C123	3409210131	Elect 100μF/16V	2B	
C124	3509101130	Ceramic 100P/50V	2C	
C125	3509203530	Ceramic 0.02μ/50V	2C	
C126	3509223530	Ceramic 0.022μ/50V	2C	
C127	3579223530	Ceramic 0.02μ/50V	2B	
C128	3509473530	Ceramic 0.047μ/50V	1B	
C129	3579103530	Ceramic 0.01μ/50V	1B	
C130	3579103530	Ceramic 0.01μ/50V	1B	
C131	3619470110	Poly 470P/50V	2A	
C132	3579203530	Ceramic 0.02μ/50V	2A	
C133	3579470130	Ceramic 47P/50V	2B	
C134	3579223530	Ceramic 0.022μ/50V	2A	
C135	3579223530	Ceramic 0.022μ/50V	2A	
C136	3479222031	Elect 22μ/16V	2B	
C137	3579103530	Ceramic 0.01μ/50V	2B	
C138	3579331130	Ceramic 330P/50V	2B	
C139	3479210971	Elect 1μ/50V	2A	
C140	3679473120	Mylar 0.047μ/100V	2B	
C141	3679332120	Mylar 0.033μ/100V	2B	
C142	3479233971	Elect 3.3μ/50V	2B	
C143	3679473120	Ceramic 0.047μ/50V	2B	
C144	3479210071	Elect 10μ/50V	2A	
C145	3579103530	Ceramic 0.01μ/50V	2A	
C146	3479210071	Elect 10μ/50V	2A	
C147	3579103530	Ceramic 0.01μ/50V	2A	
C148	3479247971	Elect 4.7μ/50V	2A	
C149	3479210971	Elect 1μ/50V	2B	
C150	3479222031	Elect 22μ/16V	2B	

Ref No.	Parts No.
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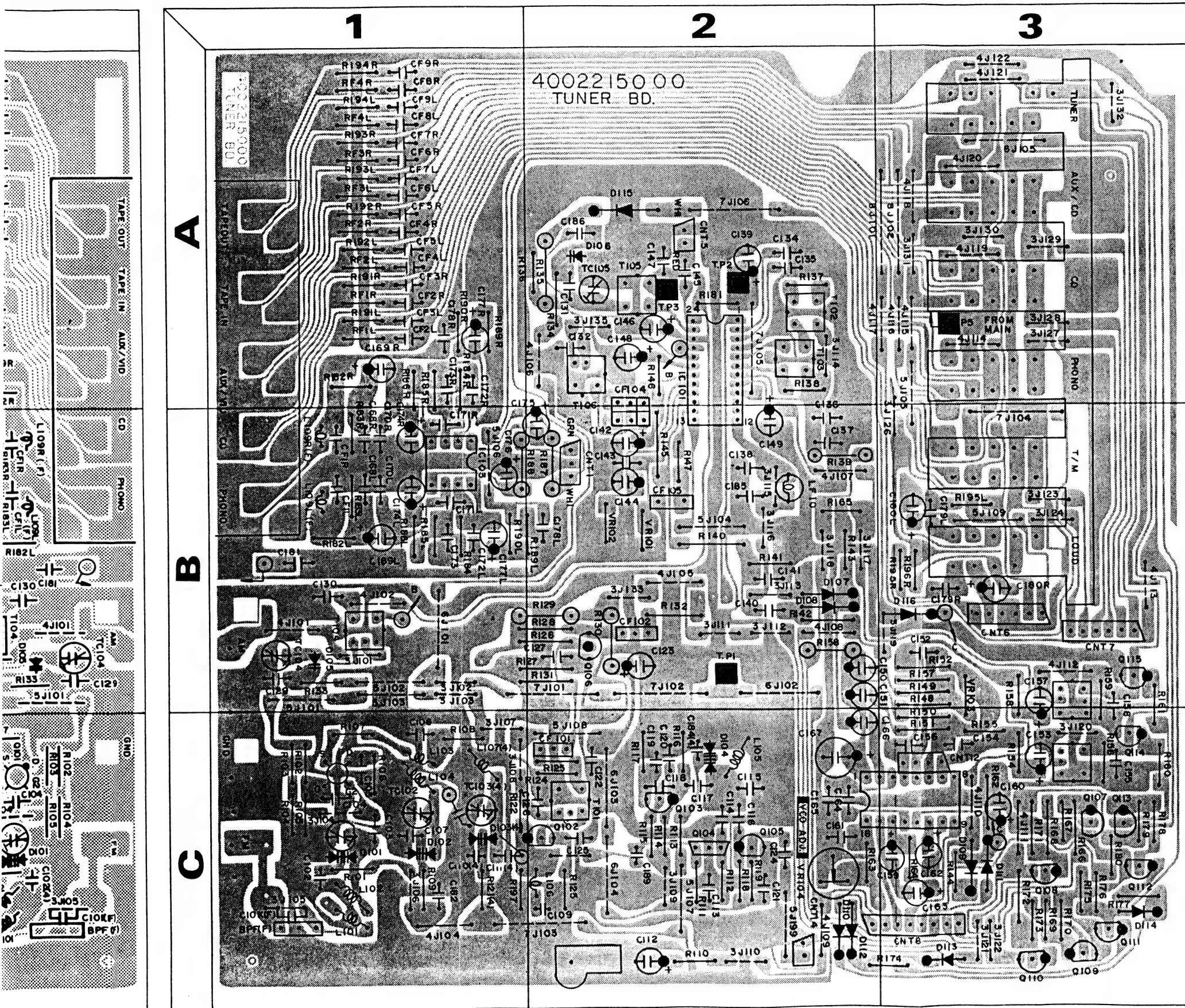
**TUNER BOARD 4002215000 (Top View)**



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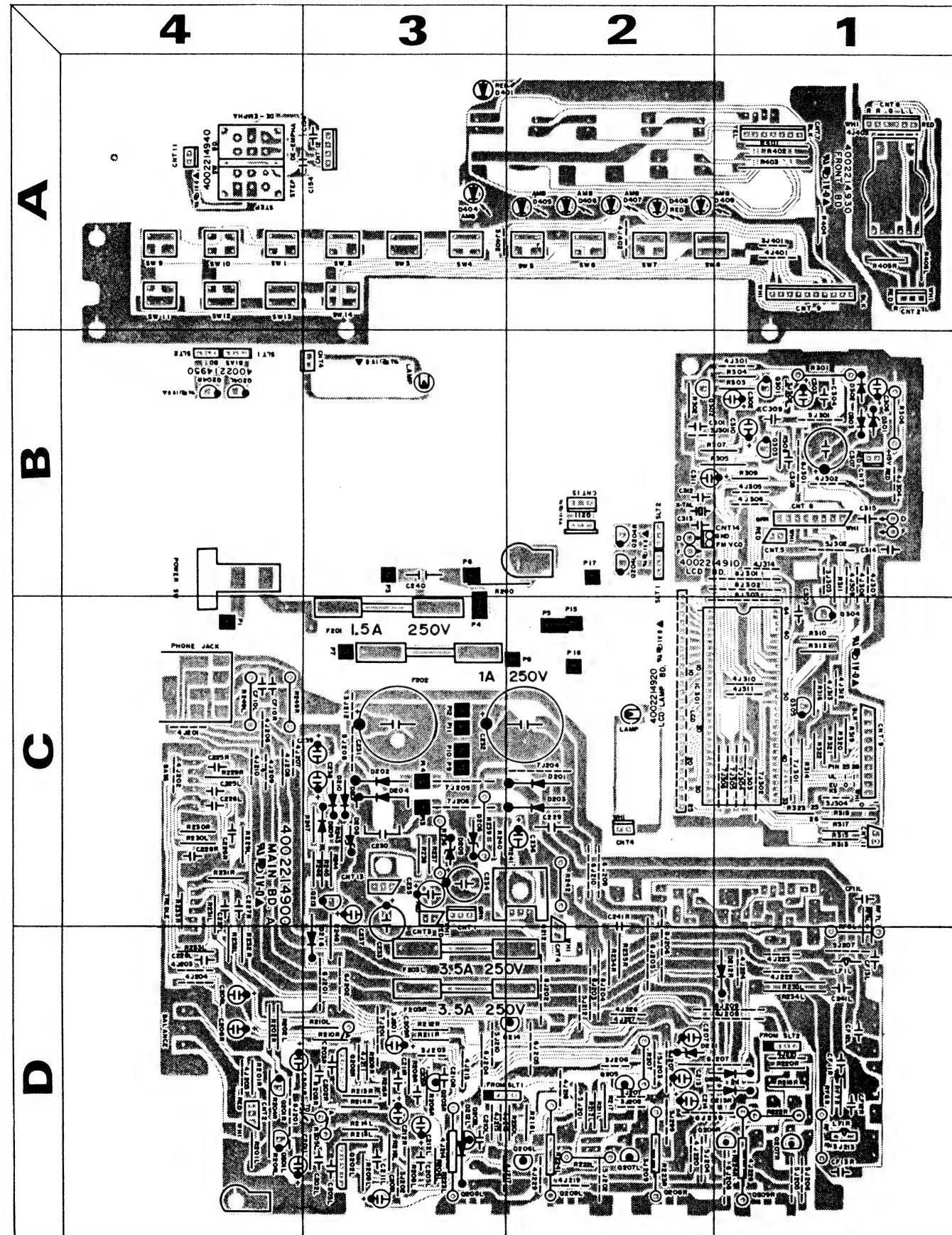
**(Bottom View)**



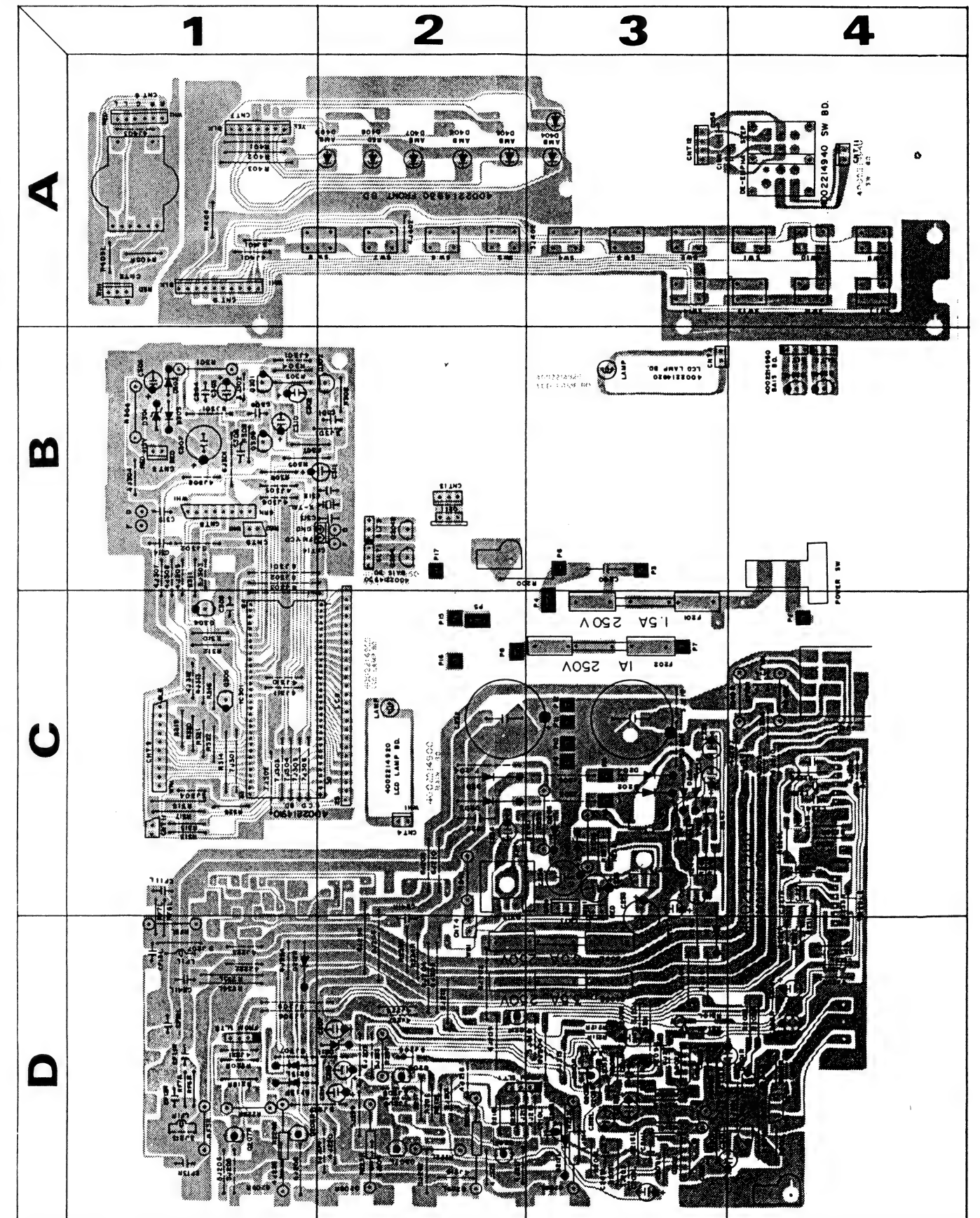


# Top & Bottom View of P.C Boards

MAIN BOARD 4002214900 (Top View)



(Bottom View)





## Block Diagram



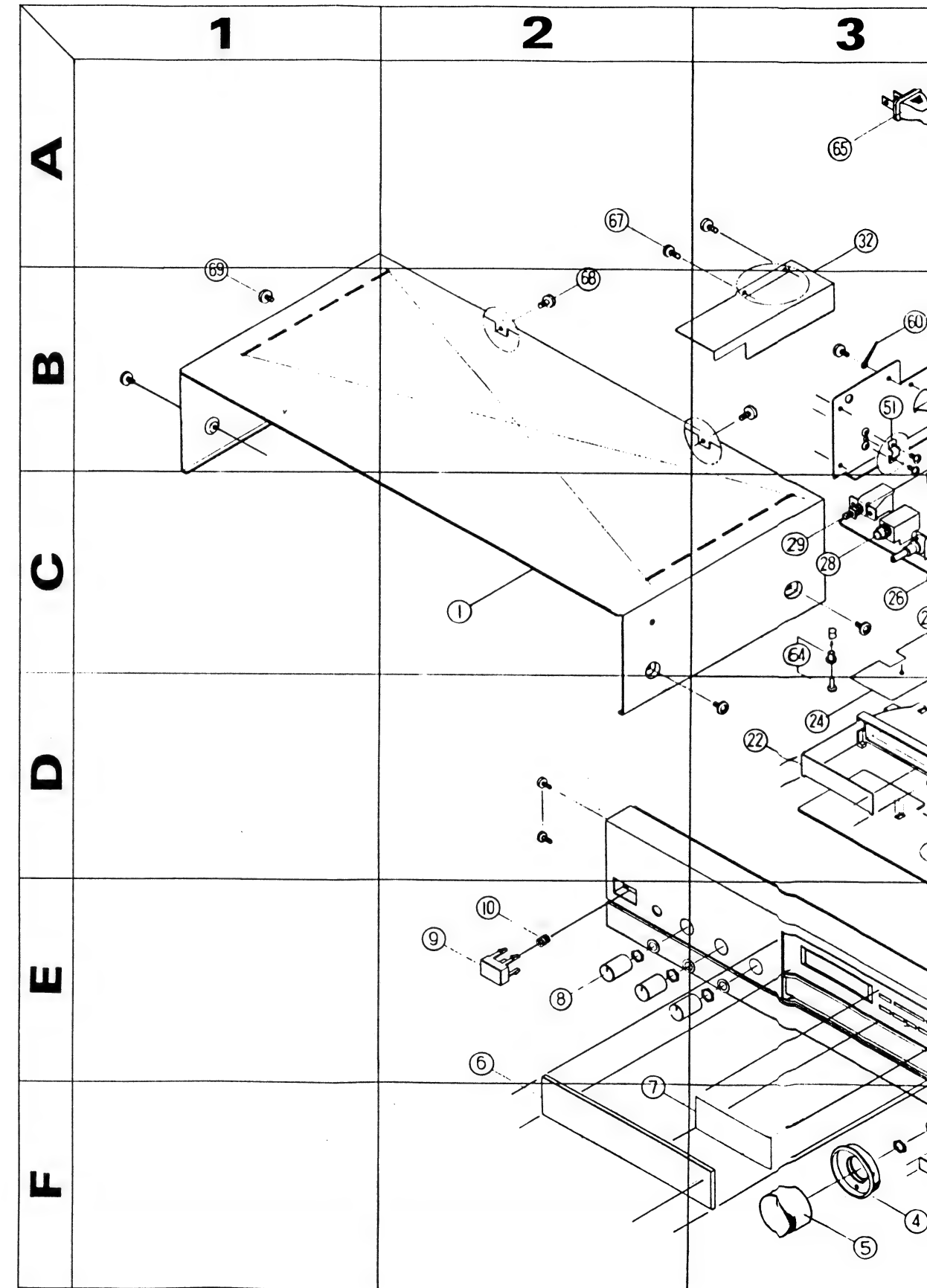


## Parts List & Exploded View of Cabinet & Chassis

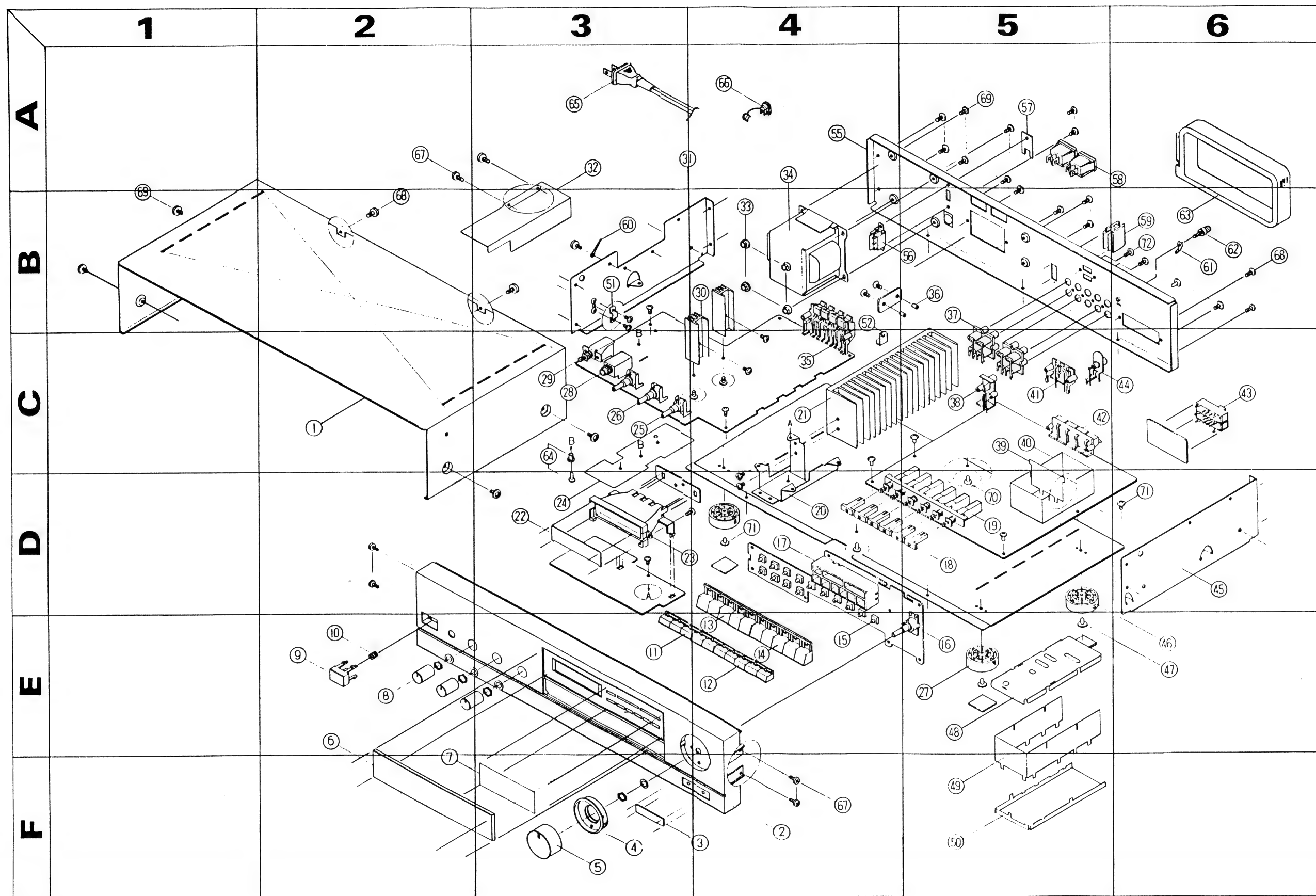
No.	PARTS NO.	DESCRIPTION	POSITION	Q'TY	POSITION
1	046122015811	COVER TOP	2C	1	
2	048501008811	PANEL FRONT	4F	1	
3	048535019011	BADGE	4F	1	
4	8523009210	RING DECORATION	3F	1	
5	8543013710	KNOB ROTARY	3F	1	
6	048533004911	WINDOW DISPLAY	2E	1	
7	8535021010	DIFFUSER	2F	1	
8	8643003510	KNOB ROTARY	2E	3	
9	048545048211	BUTTON PUSH POWER	2E	1	
10	6555004340	SPRING COIL	2E	1	
11	048543014211	BUTTON TACT(L)	3E	1	
12	048543014212	BUTTON TACT(R)	4E	1	
13	048543014311	BUTTON PUSH(L)	4E	1	
14	048543014312	BUTTON PUSH(R)	4E	1	
15	4658002610	SW TACT	4E	14	
16	3208050110	VR 100KA × 2	5E	1	
17	6063001210	HOLDER L.E.D	4D	1	
18	7005005510	SHAFT BUTTON	5D	6	
19	4628049310	SW PUSH	5D	1	
20	6503011010	BRACKET H/SINK	4D	1	
21	7503008810	H/SINK POWER	4C	1	
22	8555022410	FILTER L.C.D	3D	1	
23	6063001110	HOLDER L.C.D	3D	1	
24	6065103110	COVER FUSE(B)	3D	1	C,D,E,F
25	3208050010	VR ROTARY 250KW	3C	1	
26	3208049910	VR ROTARY 100KC × 2	3C	1	
27	046035101411	FOOT RUBBER	5E	2	
28	4438003810	MIC JACK	3C	1	
29	4628044010	SW POWER	3C	1	
30	7505200710	H/SINK REG	3B	2	
31	6123618610	FRAME LEFT	3A	1	C,D,E,F
32	6063102110	COVER FUSE(A)	3A	1	C,D,E,F
33	8209540011	NUT FLANGE M4	4B	4	
34	2828055707	TRANSFORMER	4A	1	
	2828056607	TRANSFORMER	4A		C,D,F
	2828056501	TRANSFORMER	4A		B,E
35	4408101360	TERMINAL SPEAKER	4C	1	
36	7015003110	BUSSING	5B	2	
37	4438101910	JACK RCA(4P)	5B	2	
38	4438102110	JACK RCA(2P)	5C	1	
39	6165128510	FENCE SHIELD(B)	5C	1	A,B
			5C	2	C,D,E,F
40	6163105610	FENCE SHIELD(A)	5C	1	A,B
41	4408001310	TENMINAL PUSH	5C	1	D
42	4408102610	TERMINAL ANT	5C	1	A,B,C,E,F
43	4618001610	SW SLIDE	6C	2	B
44	4438301110	JACK DIN	6C	1	D
45	6123618710	FRAME RIGHT	6D	1	
46	6035101410	FOOT RUBBER	6E	2	
47	6725002110	CUSHION FOOT	6E	4	
48	6163105710	FENCE SHIELD(C)	5E	1	D
49	6163105810	FENCE SHIELD(D)	5F	1	D
50	6165128610	FENCE SHIELD(E)	5F	1	D
51	6505080910	BKT INSULATION	3B	1	D
52	6505080710	BKT PCB	4B	1	
53					
54					
55	046102022121	CHASSIS BACK	4A	1	A
	046102022131		4A	1	B
	046102022141		4A	1	C
	046102022151		4A	1	D
	046102022161		4A	1	E
	046102022171		4A	1	F
56	4618000410	SELECTOR VOLTAGE	5B	1	B
57	6515000630	HOLDER VOLTAGE	5A	1	B
58	4448102110	OUT LET AC(2P)	5A	2	A
59	6518000210	HOLDER ANT	6B	1	
60	6525000120	CLAMP WIRE	3B	1	
61	4465100110	TERMINAL GND	6B	1	
62	4465100210	TERMINAL SCREW	6B	1	
63	260827050	AM ANT LOOP	6B	1	
64	8238000110	RIVET NYLON	3C	2	C,D,E,F
65	4308001410	CORD AC POWER	3A	1	A,B
	4308000430		3A	1	C,D,F
	4308003610		3A	1	E
66	6518000710	STOPPER CORD	4A		A,B
	6518000111		4A		C,D,E,F
67	8109330081	SCREW # 2 BTC 3×8Y	2A		
68	8119230083	SCREW # 2 PTC 3×8B	2B		
69	8159440083	SCREW WSAM 4×8B	5A	8	
70	8109330061	SCREW # 2 BTC 3×6Y	5D		

\* REMARK

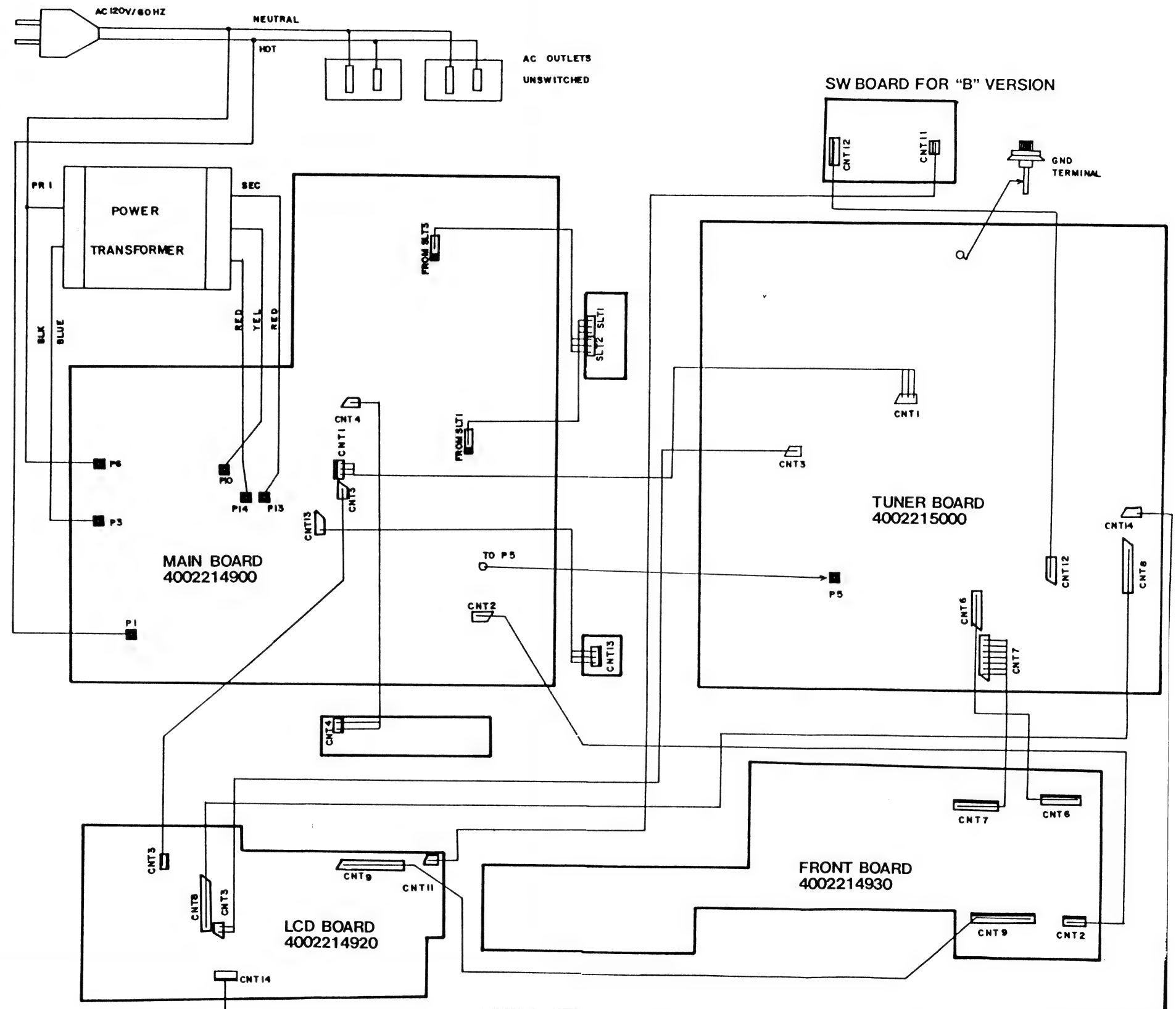
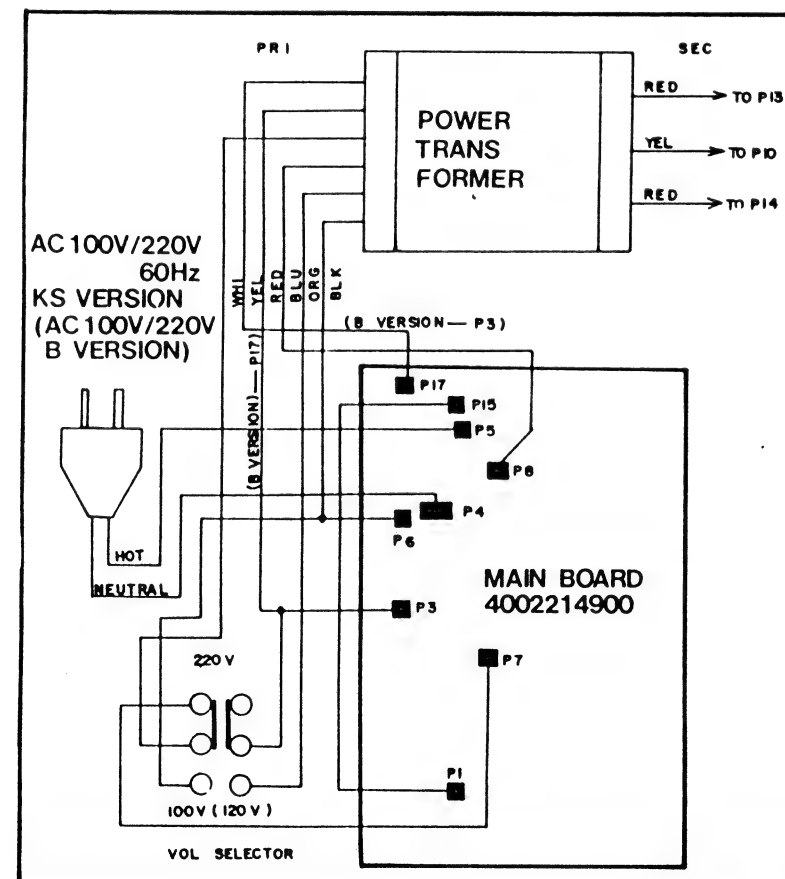
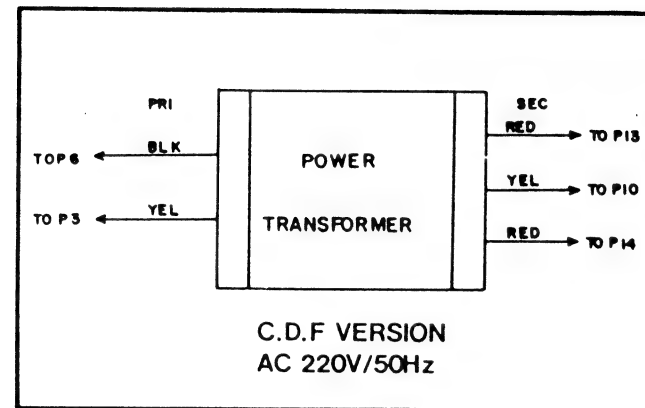
VERSION	COUNTRY	AC INPUT	REMARK (SAFTY)
A	USA/CANADA	120V/60Hz	UL, CSA
B	U.S MILITARY/OTHER COUNTRIES	120, 220V/60, 50Hz	
C	GENERAL EUROPE	220V/50Hz	IEC-65
D	GERMANY	220V/50Hz	FTZ
E	AUSTRALIA/BRITISH	240V/50Hz	SAA, BSI
F	SCANDINAVIAN COUNTRY	220V/50Hz	Ⓢ Ⓝ Ⓛ Ⓛ Ⓣ Ⓛ







## ***Point to Point Wiring Diagram***



## D

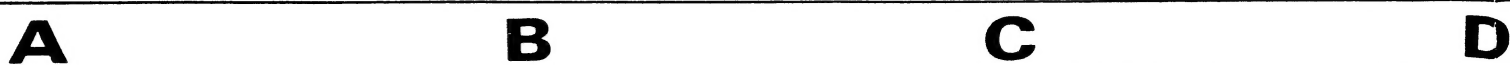


D

## 5



**A** **B** **C** **D**





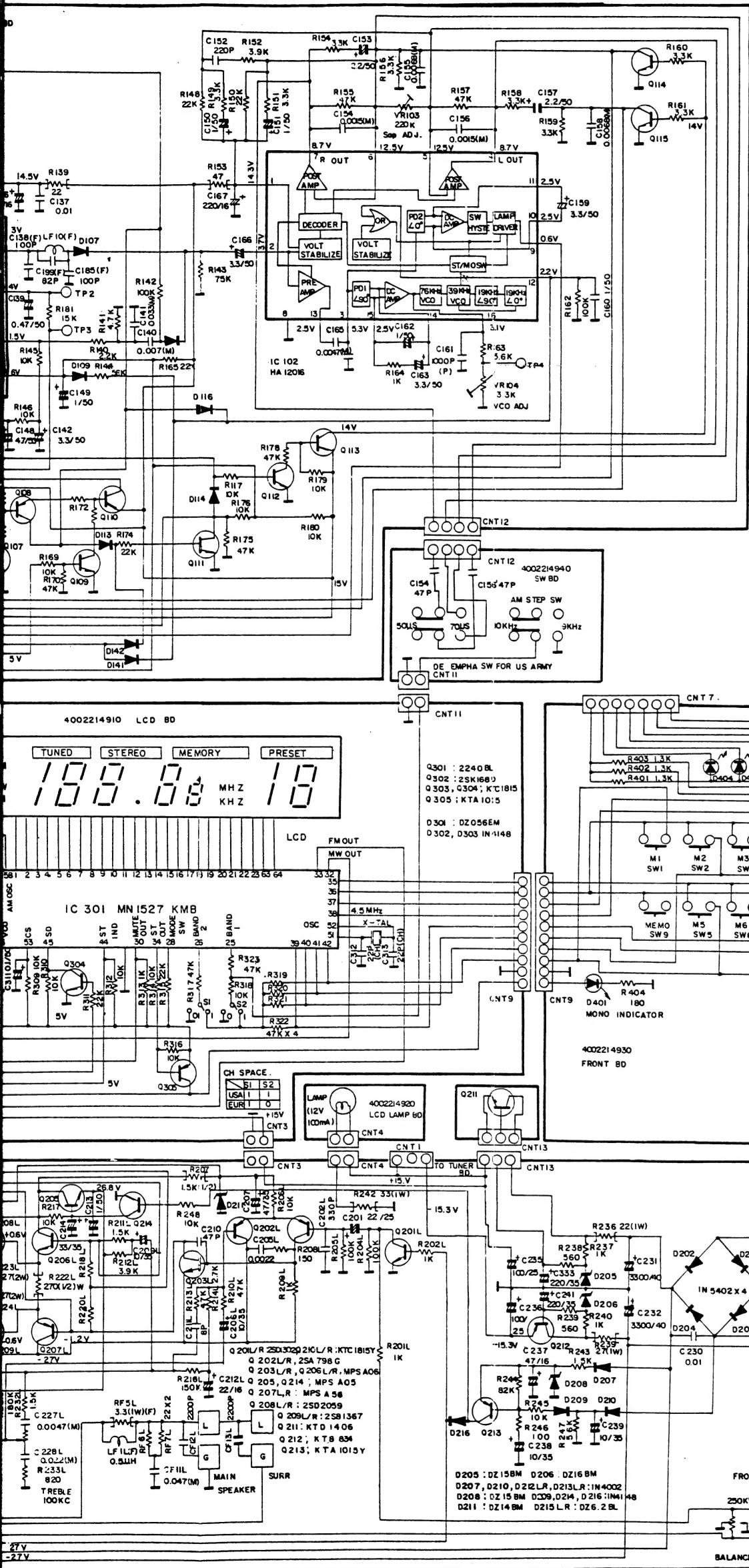
D

E

F

G

# Schematic Diagram RA1140 (I)



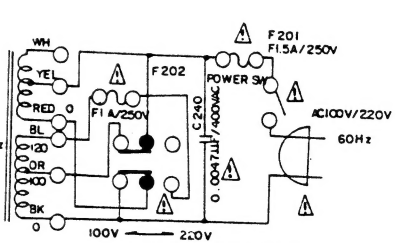
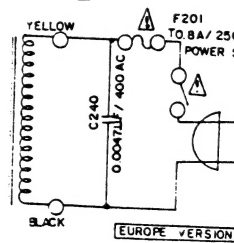
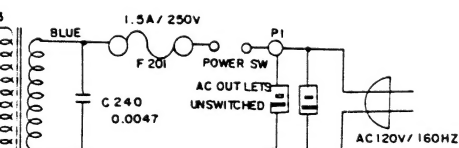
## SERVICE INFORMATION

1. RESISTANCE VALUES ARE INDICATED IN OHMS UNLESS OTHERWISE SPECIFIED. (K=1,000 M=1,000,000)
2. CAPACITANCE VALUES ARE INDICATED IN MICROFARADS UNLESS OTHERWISE SPECIFIED. (P= MICRO - MICROFARADS)
3. ALL VOLTAGES ARE MEASURED WITH GROUND:  
D.C.: VALUE WITH NO SIGNAL  
A.C.: R.M.S. (AT 80HZ 8 OHM LOAD FULL SIGNAL)
4. PRECAUTION:  
A) ALL COMPONENTS MARKED  $\Delta$  MUST BE REPLACED ONLY WITH ORIGINAL TYPE SPECIFIED BY THE MANUFACTURER, AND INSTALLED AS THE ORIGINAL, WITH SPACERS AND POSITION AWAY FROM ADJACENT COMPONENTS WHERE APPLICABLE.  
B) ALL SOLDERING MUST BE DONE IN A PROFESSIONAL MANNER USING SOLDER WITH ROSIN CORE ONLY.  
C) ALL COVERS, SHIELDS AND INSULATING SPACERS MUST BE REPLACED BEFORE RETURNING APPLIANCE TO CUSTOMER.  
D) A DAMAGED POWER SUPPLY CORD MUST BE REPLACED BEFORE RETURNING APPLIANCE TO CUSTOMER.  
E) DIELECTRIC TEST SHOULD BE DONE BEFORE RETURNING APPLIANCE TO CUSTOMER.  
TEST VOLTAGE (ULV/CSA: AC1080V, 60HZ, 1SEC, CLASS II; AC480V, 50HZ, 1SEC, CLASS I; AC1000V, 50HZ, 1MIN) SHOULD BE APPLIED BETWEEN BOTH BLADES OF THE POWER SURFACE OF THE APPLIANCE, AND THE APPLIANCE SHALL WITHSTAND WITHOUT BREAKDOWN UNDER THE CONDITION MENTIONED ABOVE.  
F) THE  $\Delta$  MARKED RESISTORS ARE MOUNTED ABOVE THE P.C.B. ON SLEEVES.

SEMICONDUCTOR NAME	FRONT VIEW	BOTTOM VIEW
TRANSISTOR 2N2222 KTA1012		
TRANSISTOR 2SC2688		
TRANSISTOR MPS405, A05, A06, A06		
TRANSISTOR KT88, B406 2SD2059Y		
MOS-FET 3SK-74L		
FET 2SK161		
FET 2SK168		
TRANSISTOR 2SA798G		
DIODE VARIATOR KY1310-A		
DIODE VARIATOR KY-1235Z		
TRANSISTOR LM9018		

FUNCTION INDICATORS  
D404: TUNER D405: AUX/VID  
D406: CD D407: PHONO  
D408: TAPE MONITOR  
D409: LOUDNESS

FROM TUNER BD  
TO MAIN BD



D

E

F

G